

Lecture 10 – Leveling Loop Adjustments

LEVEL LOOP ADJUSTMENTS

Federal Geodetic Control Subcommittee (FGCS) Vertical Accuracy Standards

Order and Class	Accuracy Required
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First Order

Class 1	$4 \text{ mm} * \sqrt{K}$
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Class II	$5 \text{ mm} * \sqrt{K}$
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Second Order

Class I	$6 \text{ mm} * \sqrt{K}$
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Class II	$8 \text{ mm} * \sqrt{K}$
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Third Order	$12 \text{ mm} * \sqrt{K}$
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Applying Accuracy Standards to a 3.0 mile Course

First Order

Class I $4 \text{ mm} * 2.20 = 8.79 \text{ mm} = 0.03'$

Class II $5 \text{ mm} * 2.20 = 10.10 \text{ mm} = 0.12'$

Second Order

Class I $6 \text{ mm} * 2.20 = 13.18 \text{ mm} = 0.14'$

Class II $8 \text{ mm} * 2.20 = 17.58 \text{ mm} = 0.19'$

Third Order $12 \text{ mm} * 2.20 = 26.37 \text{ mm} = 0.28'$

Level Loop Adjustments with Unknown Horizontal Distance

Procedures:

Example:

	Setups	Correction	Elev	Adj Elev
A			100.00	
	1			
B			110.60	
	2			
C			116.02	
	3			
D			107.55	
	4			
A			100.24	
	-0.06		-0.24	

Level Loop Adjustments with Known Horizontal Distance

Procedures:

Example:

	HD	Elev	Elev Diff	Correction	Adj Diff	Adj Elev
A		100.00				100.00
	1.0					
B		110.60				
	0.7					
C		116.02				
	0.8					
D		107.55				
	0.5					
A		100.24				
	3.0	-0.24		-0.08		